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CALCIUM CYANIDE

FUMIGATION

PROCEDURES



Agricultural and Industrial Chemicals Section
Hazardous Contaminants Coordination Branch
Ministry of the Environment

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CALCIUM CYANIDE

PROCEDURES FOR FUMIGATION

1. GENERAL CHARACTERISTICS AND USES

Calcium cyanide decomposes in the presence of moisture to give calcium hydroxide and hydrocyanic acid. Hydrocyanic acid gas is commonly known as hydrogen cyanide (HCN). This gas kills insects and rodents very quickly, however penetration of material is poor compared to other fumigants. In Canada, two products are registered. These products are classified as Schedule 1 pesticides in Ontario.

Label use restricts one of these two products to the destructions of diseased or waxmoth-infested honeybee colonies only. The other available formulation allows outdoor control of rodents in addition to killing off diseased or infested honeybee colonies.

These products may be used by a Structural 1 licenced person or an endorsed Structural Class 6 licenced person (premises endorsement). A beekeeper must acquire a permit (Form 10) prior to use of the product, but no licence is required. See the Pesticides Act and Regulation, Section 76 for further exemptions.

2. CHEMICAL, PHYSICAL AND TOXICOLOGICAL PROPERTIES

Chemical Formula	Ca(CN) ₂
Boiling Point	26°C (78.8°F)
Physical Appearance	Dark grey granules/dust
Specific Gravity of Gas (Air=1)	0.9 (slightly lighter than air)
Molecular Weight	27.03
Odour	Bitter almond
Degree of Sorption	High
Solubility in Water	Readily soluble
TLV (Threshold Limit Value)	10 ppm
Flammability	Yes, in air at 6%-41% by volume

Toxicity

HCN is a very fast-acting fumigant which can cause immediate death at concentrations over 200 ppm. Exposure by dermal, inhalation or oral contact to HCN may be lethal depending on concentration and duration of exposure. A full respiratory gas mask should be worn at all times with an approved canister for acid gas (usually white with a green stripe). Due to the ability of HCN to be absorbed through the skin (especially moist skin), full body covering must be worn during the fumigation.

HCN induces asphyxiation by acting on the mitochondria of the cell, and inhibiting respiratory enzymes. Tissues can therefore not utilize oxygen carried in the blood. If the patient is removed from the source of absorption, full recovery with no irreversible effects is possible.

Acute Poisoning

Ingesting or inhaling large amounts of hydrocyanic acid (10 times minimum lethal dose) produces immediate unconsciousness, convulsions and death within one to fifteen minutes.

Ingesting and inhaling or absorbing through the skin an amount near the minimum lethal dose causes dizziness, rapid respiration, headache, fall in blood pressure, rapid pulse and unconsciousness.

Chronic Poisoning

Inhaling small amounts of hydrocyanic acid over a prolonged period may cause dizziness, weakness, congestion of the

lungs, hoarseness, conjunctivitis, loss of appetite, weight loss and mental deterioration. HCN, however, is not accumulative and if the patient is removed from all exposure, the symptoms will usually cease.

FIRST AID (Inhaled Cyanide)

1. Remove to uncontaminated atmosphere.
2. Remove clothing and wash exposed skin with soap and water - keep patient warm.
3. Call a physician.
4. If a patient is unconscious, break an amyl nitrite pearl in a piece of cloth and hold lightly to the patient's nose for 15 seconds. Repeat this five times at about 15 second intervals.
5. If patient stops breathing, give artificial respiration until the doctor arrives and takes charge. Artificial respiration may be difficult to give especially while administering amyl nitrite. In addition, if the patient has been exposed to high levels of HCN the rescuer is also in danger of becoming contaminated.

ANTIDOTE (To be Administered by a Doctor)

- (a) As soon as possible, give 10 millilitres of 3% sodium nitrite solution intravenously at the rate of 2.5 to 5 millilitres per minute. Stop administration if systolic blood pressure goes below 80 millimetres of mercury.

- (b) Follow sodium nitrite with 50 millilitres of 25% sodium thiosulphate solution intravenously at a rate of 2.5 to 5 millilitres per minute.
- (c) Be prepared to repeat treatments detailed in (a) and (b) if symptoms reappear.

TEST WITH METHYL ORANGE PAPER

The use of methyl orange test papers is an aid in determining the presence or absence of hydrocyanic acid. These are small strips of paper of an orange colour which, in the presence of an atmosphere containing hydrocyanic acid, turn pink or red and are very sensitive to relatively low concentrations of the gas. If methyl orange test papers do not change colour within two minutes after exposure to a supposed concentration of calcium cyanide, the space is safe for human occupancy.

FUMIGATION PROCEDURES

HCN is to be used for outdoor use only. Be sure rodent burrows do not run beneath structures. If so, do not use this product.

Rats in Burrows

Pump calcium cyanide dust into the burrow openings with a calcium cyanide foot pump. After a few strokes of the pump, dust will be seen to emerge from other connecting holes in the vicinity. Close these other holes from which dust

emerges. Remove pump nozzle and block the hole into which the dust was pumped. Treat all visible burrows in the same way.

Rats Under Sidewalks and Pavements

Find entrance, and pump calcium cyanide dust into hideout. If no entrance can be found, probe under the walk for hollow spaces, which represent rat harborages. Keep all people and pets away from this operation for at least one hour after applications.

Rats in Poultry Houses, Barns and Other Farm Buildings

Remove from the building all animals and birds before the dusting operation, to prevent injury from the gas which might seep up through the floors. Treat all visible holes with calcium cyanide dust by means of a calcium cyanide foot pump, and block all other openings from which dust is seen to emerge. Air buildings well for three hours, and check with methyl orange test papers before re-occupying.

GROUNDHOGS (Woodchucks)

Place 15 ml of calcium cyanide dust as far down each burrow as possible. Use a long-handled spoon or a spoon fastened to a stick. Upset the spoon, spilling the calcium cyanide in a pile. Do not scatter it. Close the entrance tightly with upturned sod and try to prevent loose dirt from falling on the calcium cyanide. Treat groundhog burrows preferably in the morning, and not later than mid-afternoon. Treat only burrows showing fresh signs of groundhog activity.

MOLES

Make an opening every 1.5 m to 3 m along the entire system with a pointed stick. Start at one end of the runway and blow calcium cyanide dust into the openings in both directions with a calcium cyanide foot pump, until dust is seen to emerge from the nearest holes. The openings should then be covered with sod and the dust pumped into each succeeding hole from which dust has not emerged, until all have been treated and covered. Application should be made early in the morning or at dusk. Attempt to treat the entire system of a runway at the same time.

BEEKEEPER'S USES FOR CALCIUM CYANIDE

Diseased or Infested Honeybee Colonies

Honeybees may be destroyed by placing 15 ml of calcium cyanide dust on a piece of cardboard, and slipping this into the entrance of the hive. Close entrance. Work should be done at night when bees are all in the hive and quiet.

Diseased colonies must be burned after fumigation. Contact Bee Maid Honey Ltd., 625 Roseberry Street, Winnipeg, Manitoba R3H 0T4 for further information.

STORAGE OF CALCIUM CYANIDE

Tins of calcium cyanide must be stored under lock and key in a dry place. If tins show signs of rusting DO NOT keep them in your possession. Notify the nearest office of the Ministry of the Environment, or the distributor (see label instructions) who will arrange with you for the disposal of the tin and contents.

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